

*If you are using a printed copy of this procedure, and not the on-screen version, then you **MUST** make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.*

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.15.h Refrigerator Building 1005R (PEER 19) ODH Tests

| C-A-OPM Procedures in which this Attachment is used. | | |
|--|--|--|
| 4.120.15 | | |
| | | |
| | | |

Hand Processed Changes

| <u>HPC No.</u> | <u>Date</u> | <u>Page Nos.</u> | <u>Initials</u> |
|----------------|-------------|------------------|-----------------|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

Approved: _____ *Signature on File* _____
 Collider-Accelerator Department Chairman Date

V. Castillo

4.120.15.h Refrigerator Building 1005R (PEER 19) ODH Tests

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title:_____Checksum: _____

Division B Software Filename and Checksum: Title:_____Checksum: _____

Initial testing complete:

Test Team Leader's Name (Print): _____Life Number: _____

Test Team Leader's Name (Sign): _____Date: ____/____/____

Acceptance test procedure complete (following repairs and retesting if required):

Test Team Leader's Name (Print): _____Life Number: _____

Test Team Leader's Name (Sign): _____Date: ____/____/____

Test results reviewed by:

Safety Section Head's Name (Print): _____Life Number: _____

Safety Section Head's Name (Sign): _____Date: ____/____/____

Test results accepted by Radiation Safety Committee:

RSC Member's Name (Print): _____Life Number: _____

RSC Member's Name (Sign): _____Date: ____/____/____

- 1.1 Conduct a visual check on Peer 19 ODH boxes following Table 1 below
 ✓ = ok, x = problem

Note: ODH units 5Y-ODB1 and 5Y-ODB2 located in the ceiling are no longer in service.

| ODH BOXES | Verify mechan condn. ok | Verify elec. condn. ok | Crash/ODH boxes only | | | | Verify all X's corrected |
|----------------------------|-------------------------------|---------------------------------|----------------------|-------------------|------------|-------------------|--------------------------------|
| | | | Division A | | Division B | | |
| | | | Lcd Rdg | Tp2 – Tp4 Vltg | Lcd Rdg | Tp2 – Tp4 Vltg | |
| 5Y-ODB3 | <input type="checkbox"/> | <input type="checkbox"/> | % | V | % | V | <input type="checkbox"/> |
| 5Y-ODB4 | <input type="checkbox"/> | <input type="checkbox"/> | % | V | % | V | <input type="checkbox"/> |
| 5Y-ODB5 | <input type="checkbox"/> | <input type="checkbox"/> | % | V | % | V | <input type="checkbox"/> |
| 5Y-ODB6 Sampling System | <input type="checkbox"/> | <input type="checkbox"/> | % | V | % | V | <input type="checkbox"/> |

Table 1 – Summary of visual check on ODH boxes in the Refrigerator Building

- ☐ Check for acceptance of visual check on Peer 19 ODH boxes

- 1.2 Verification of valid calibration of ODH sensors in Peer 19, following Table 2 below
 ✓ = ok, x = problem

Note: ODH sensors AS5Y-1 and AS5Y-2 located in the ceiling are no longer in service.

| ODH sensor | Verify valid calibration | Record calibration date | Verify all x's corrected | Record new calibration date |
|---------------------------|-----------------------------|-------------------------|-----------------------------|--------------------------------|
| AS5Y-3 | <input type="checkbox"/> | ____/____/____ | <input type="checkbox"/> | ____/____/____ |
| AS5Y-4 | <input type="checkbox"/> | ____/____/____ | <input type="checkbox"/> | ____/____/____ |
| AS5Y-5 | <input type="checkbox"/> | ____/____/____ | <input type="checkbox"/> | ____/____/____ |
| AS5Y-6 Sampling Sensor | <input type="checkbox"/> | ____/____/____ | <input type="checkbox"/> | ____/____/____ |

Table 2 – Verification of valid calibration of ODH sensors in Refrigerator Building

- ☐ Check for acceptance of Verification of valid calibration of ODH sensors in Peer 19

1.3 Jumper Test of ODH sensor AS5Y-3 in 5Y-ODB3

| | | |
|--|--|-----------------|
| JUMPER | Tp2 and Tp4 on the Div A and Div B Pcb's in 5Y-ODB3 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-3 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | ODH |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| <input type="checkbox"/> VERIFY | Attempt to turn fans off at Stations: #1 <input type="checkbox"/>, #2 <input type="checkbox"/> | FAIL |
| TURN | Div A Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | STOP |
| TURN | Div A Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | CONTINUE |
| TURN | Div B Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | STOP |
| TURN | Div B Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | CONTINUE |
| REMOVE | Jumper from the Div A and Div B Pcb's in 5Y-ODB3 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-3 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| RESET | ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| <input type="checkbox"/> | Check for acceptance of Jumper Test of ODH sensor AS5Y-3 in 5Y-ODB3 | |

1.4 Jumper Test of ODH sensor AS5Y-4 in 5Y-ODB4

| | | |
|--|--|-----------------|
| JUMPER | Tp2 and Tp4 on the Div A and Div B Pcb's in 5Y-ODB4 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-4 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | ODH |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| <input type="checkbox"/> VERIFY | Attempt to turn fans off at Stations: #1 <input type="checkbox"/>, #2 <input type="checkbox"/> | FAIL |
| TURN | Div A Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | STOP |
| TURN | Div A Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | CONTINUE |
| TURN | Div B Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | STOP |
| TURN | Div B Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | CONTINUE |
| REMOVE | Jumper from the Div A and Div B Pcb's in 5Y-ODB4 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-4 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| RESET | ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| <input type="checkbox"/> | Check for acceptance of Jumper Test of ODH sensor AS5Y-4 in 5Y-ODB4 | |

1.5 Jumper Test of ODH sensor AS5Y-5 in 5Y-ODB5

| | | |
|--|--|-----------------|
| JUMPER | Tp2 and Tp4 on the Div A and Div B Pcb's in 5Y-ODB5 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-5 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | ODH |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| <input type="checkbox"/> VERIFY | Attempt to turn fans off at Stations: #1 <input type="checkbox"/>, #2 <input type="checkbox"/> | FAIL |
| TURN | Div A Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | STOP |
| TURN | Div A Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | CONTINUE |
| TURN | Div B Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | STOP |
| TURN | Div B Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | CONTINUE |
| REMOVE | Jumper from the Div A and Div B Pcb's in 5Y-ODB5 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-5 Div A and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| RESET | ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| <input type="checkbox"/> | Check for acceptance of Jumper Test of ODH sensor AS5Y-5 in 5Y-ODB5 | |

1.6 Jumper Test of ODH sensor AS5Y-6 in 5Y-ODB6

| | | |
|--|--|-----------------|
| JUMPER | Tp2 and Tp4 on the Div A and Div B Pcb's in 5Y-ODB6 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-6 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | ODH |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| <input type="checkbox"/> VERIFY | Attempt to turn fans off at Stations: #1 <input type="checkbox"/>, #2 <input type="checkbox"/> | FAIL |
| TURN | Div A Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | STOP |
| TURN | Div A Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div A Strobes and Beacons | CONTINUE |
| TURN | Div B Bypass Switch to Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | STOP |
| TURN | Div B Bypass Switch from Bypass | |
| <input type="checkbox"/> VERIFY | All Div B Strobes and Beacons | CONTINUE |
| REMOVE | Jumper from the Div A and Div B Pcb's in 5Y-ODB6 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-6 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| RESET | ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| <input type="checkbox"/> | Check for acceptance of Jumper Test of ODH sensor AS5Y-6 in 5Y-ODB6 | |

1.7 Test of Manual ON/OFF Switch at Station #1

- PRESS** Fan **ON** button at **Station #1**
- START** **90 Sec counter**
- | | | | |
|--------------------------|---------------|---------------------------------------|---------------|
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | OPENED |
- PRESS** Fan **OFF** button at **Station #1**
- AFTER** **> 90 Secs from ON command**
- | | | | |
|--------------------------|---------------|---------------------------------------|---------------|
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | CLOSED |
- ☐ **Check for Test Acceptance of Manual ON/OFF Switch at Station #1**

1.8 Test of Manual ON/OFF Switch at Station #2

- PRESS** Fan **ON** button at **Station #1**
- START** **90 Sec counter**
- | | | | |
|--------------------------|---------------|---------------------------------------|---------------|
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | OPENED |
- PRESS** Fan **OFF** button at **Station #1**
- AFTER** **> 90 Secs from ON command**
- | | | | |
|--------------------------|---------------|---------------------------------------|---------------|
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | CLOSED |
- ☐ **Check for Test Acceptance of Manual ON/OFF Switch at Station #2**

1.9 Test of ODH sensor AS5Y-3 in 5Y-ODB3 with gas

| | | | |
|--------------------------|--|--|-----------------|
| FLOW | | Helium or Nitrogen across sensor AS5Y-3 | |
| <input type="checkbox"/> | VERIFY | MCR sees AS5Y-3 Div A and B | ODH |
| | RECORD | Oxygen trip level for Div A | _____ % |
| | RECORD | Oxygen trip level for Div B | _____ % |
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> | VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> | VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> | VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | OPENED |
| HALT | | Flow of gas on AS5Y-3 | |
| WAIT | | For AS5Y-3 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> | VERIFY | MCR sees AS5Y-3 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> | VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> | VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> | VERIFY | All rotating red Beacons are | OFF |
| AFTER | | > 90 Secs | |
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | CLOSED |
| RESET | | Refrigerator ODH in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| <input type="checkbox"/> | Check for Acceptance of Test of ODH sensor AS5Y-3 in 5Y-ODB3 with gas | | |

1.10 Test of ODH sensor AS5Y-4 in 5Y-ODB4 with gas

| | | |
|--|--|-----------------|
| FLOW | Helium or Nitrogen across sensor AS5Y-4 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-4 Div A and B | ODH |
| RECORD | Oxygen trip level for Div A | _____ % |
| RECORD | Oxygen trip level for Div B | _____ % |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| HALT | Flow of gas on AS5Y-4 | |
| WAIT | For AS5Y-4 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-4 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| RESET | Refrigerator ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| <input type="checkbox"/> | Check for Acceptance of Test of ODH sensor AS5Y-4 in 5Y-ODB4 with gas | |

1.11 Test of ODH sensor AS5Y-5 in 5Y-ODB5 with gas

| | | |
|--|--|-----------------|
| FLOW | Helium or Nitrogen across sensor AS5Y-5 | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-5 Div A and B | ODH |
| RECORD | Oxygen trip level for Div A | _____ % |
| RECORD | Oxygen trip level for Div B | _____ % |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| HALT | Flow of gas on AS5Y-5 | |
| WAIT | For AS5Y-5 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-5 Div A <input type="checkbox"/> and Div B <input type="checkbox"/> | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| RESET | Refrigerator ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| <input type="checkbox"/> | Check for Acceptance of Test of ODH sensor AS5Y-5 in 5Y-ODB5 with gas | |

1.12 Test of ODH Sampling System sensor AS5Y-6 in 5Y-ODB6 with gas

| | | |
|--|--|-----------------|
| FLOW | Helium or Nitrogen ~ 1" from far input port of Sampling System | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-1 <input type="checkbox"/>, -2 <input type="checkbox"/>, -3 <input type="checkbox"/>, -4 <input type="checkbox"/>, - 5 <input type="checkbox"/> Div A and B | ODH |
| RECORD | Time for Trip | _____ secs |
| RECORD | Oxygen trip level for Div A | _____ % |
| RECORD | Oxygen trip level for Div B | _____ % |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| HALT | Flow of gas on AS5Y-6 | |
| WAIT | For AS5Y-6 to clear (level ~ trip-level above) | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-1 <input type="checkbox"/>, -2 <input type="checkbox"/>, -3 <input type="checkbox"/>, -4 <input type="checkbox"/>, - 5 <input type="checkbox"/> Div A and B | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/>, 5Y-ODB2 <input type="checkbox"/>, 5Y-ODB3 <input type="checkbox"/>, 5Y-ODB4 <input type="checkbox"/>, 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | OFF |
| AFTER | > 90 Secs | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | CLOSED |
| RESET | Refrigerator ODH in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| <input type="checkbox"/> | Check for Acceptance of Test of ODH sensor AS5Y-6 in 5Y-ODB6 with gas | |

1.13 Test of Sampling System Pump

| | | |
|--|--|-----------------|
| SELECT | Airflow from the Sampling System Panel View (SSPV) menu | |
| RECORD | Airflow value from SSPV | _____ |
| RECORD | HiThresh value from SSPV | _____ |
| RECORD | LoThresh value from SSPV | _____ |
| RECORD | Offset value from SSPV | _____ |
| SELECT | Exit from SSPV menu to get Operation | STATUS |
| <input type="checkbox"/> VERIFY | Operation Status is | NORMAL |
| CLOSE | Flow valve to Sensor | |
| <input type="checkbox"/> VERIFY | After ~ _____ Secs SSPV shows | TROUBLE |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-1 <input type="checkbox"/> , -2 <input type="checkbox"/> , -3 <input type="checkbox"/> , -4 <input type="checkbox"/> , - 5 <input type="checkbox"/> Div A and B | ODH |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/> , 5Y-ODB2 <input type="checkbox"/> , 5Y-ODB3 <input type="checkbox"/> , 5Y-ODB4 <input type="checkbox"/> , 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is | OPENED |
| OPEN | Flow valve to Sensor | |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-1 <input type="checkbox"/> , -2 <input type="checkbox"/> , -3 <input type="checkbox"/> , -4 <input type="checkbox"/> , - 5 <input type="checkbox"/> Div A and B still | ODH |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is still | ON |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/> , 5Y-ODB2 <input type="checkbox"/> , 5Y-ODB3 <input type="checkbox"/> , 5Y-ODB4 <input type="checkbox"/> , 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are still | ON |
| <input type="checkbox"/> VERIFY | All red Strobes are still | FLASHING |
| <input type="checkbox"/> VERIFY | All rotating red Beacons are still | ON |
| <input type="checkbox"/> VERIFY | MCR sees Refrigerator Fans are still | ON |
| <input type="checkbox"/> VERIFY | Fan REF1 is still | ON |
| <input type="checkbox"/> VERIFY | Fan REF2 is still | ON |
| <input type="checkbox"/> VERIFY | Vent RAV1 is still | OPENED |
| <input type="checkbox"/> VERIFY | Vent RAV2 is still | OPENED |
| GO TO | Main menu on SSPV (Hit Enter key twice) | |
| SELECT | Silence option | |
| ENTER | Password | |
| SELECT | Reset and Hit Enter | |
| <input type="checkbox"/> VERIFY | After _____ secs (~ 15 secs acceptable) SSPV Alarm is | OFF |
| <input type="checkbox"/> VERIFY | MCR sees AS5Y-1 <input type="checkbox"/> , -2 <input type="checkbox"/> , -3 <input type="checkbox"/> , -4 <input type="checkbox"/> , - 5 <input type="checkbox"/> Div A and B | OK |
| <input type="checkbox"/> VERIFY | Div A & B Blue strobes & Alarms on: 5Y-ODB1 <input type="checkbox"/> , 5Y-ODB2 <input type="checkbox"/> , | |

| | | | |
|--------------------------|---|---|---------------|
| <input type="checkbox"/> | VERIFY | 5Y-ODB3 <input type="checkbox"/> , 5Y-ODB4 <input type="checkbox"/> , 5Y-ODB5 <input type="checkbox"/> and 5Y-ODB6 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> | VERIFY | All red Strobes are | OFF |
| <input type="checkbox"/> | VERIFY | All rotating red Beacons are | OFF |
| | AFTER | > 90 Secs | |
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator Fans are | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF1 is | OFF |
| <input type="checkbox"/> | VERIFY | Fan REF2 is | OFF |
| <input type="checkbox"/> | VERIFY | Vent RAV1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | Vent RAV2 is | CLOSED |
| | SELECT | Exit from SSPV menu to get Operation | STATUS |
| <input type="checkbox"/> | VERIFY | Operation Status is | NORMAL |
| | SELECT | Airflow from the Sampling System Panel View (SSPV) menu | |
| | RECORD | Airflow value from SSPV | _____ |
| | RECORD | HiThresh value from SSPV | _____ |
| | RECORD | LoThresh value from SSPV | _____ |
| | RECORD | Offset value from SSPV | _____ |
| | RESET | Refrigerator ODH in MCR | |
| | LEAVE | SSPV in menu with Operation Status | NORMAL |
| <input type="checkbox"/> | VERIFY | MCR sees Refrigerator ODH alarm on Cryo page is | OK |
| <input type="checkbox"/> | Check for acceptance of Test of Sampling System Pump | | |

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: ____/____/____

TTL: Sign for completion of final testing: _____

Date: ____/____/____